

### **AMENDMENTS TO THE CLAIMS**

This listing of claims will replace all prior versions and listings of claims in the application.

#### **Listing of Claims:**

Claim 1 (Currently amended): A ~~servo positioning~~servo positioning system for a linear data recording system, comprising in combination:

- a) a linear data recording medium, upon which are recorded a time-based servo signal, and a timing reference signal having a bandwidth; and
- b) circuitry, separately responsive to the timing reference and time-based servo signals, for
  - (i) producing position error signals by sampling the time-based servo signal at a sampling rate; and
  - (ii) increasing the bandwidth of the timing reference signal above the sampling rate of (i).

Claim 2 (Original): The system of claim 1, in which the measurement time base for producing the position error signals is derived from the timing reference signal.

Claim 3 (Currently amended): The system of claim 1, in which the timing reference signal's frequency lies in a playback null of the time-based ~~servo positioning~~servo positioning system.

Claim 4 (Original): The system of claim 3, in which the timing reference signal and the time-based servo signal are recorded at different azimuth angles with respect to each other.

Claim 5 (Original): The system of claim 3, in which the time-based servo signal comprises at least one sample, each sample comprising at least two pulses, the spacing between the pulses being such that the pulses fall on unique phases of the timing reference signal.

Claim 6 (Original): The system of claim 5, in which there are four pulses in each sample, each of the four pulses falling ninety degrees out of phase with each other, and a first pulse falling on a zero degree phase of the timing reference signal.

Claim 7 (Original): The system of claim 1, in which the timing reference signal further comprises a side band amplitude modulated component.

Claim 8 (Original): The system of claim 7, in which the timing reference signal further comprises a double side band amplitude modulated component.

Claim 9 (Original): The system of claim 7, in which the modulated component comprises at least one of linear position data, manufacturing data, synchronization data, error detection data, error correction data, and encoded data.

Claim 10 (Currently amended): A method of ~~servo~~positioning~~servo~~ positioning for use with a data recording system, comprising:

- a) writing on a linear data recording medium a time-based servo signal, and a timing reference signal having a bandwidth;
- b) producing position error signals by sampling the time-based servo signal at a sampling rate; and
- c) increasing the bandwidth of the timing reference signal above the sampling rate.

Claim 11 (Original): The method of claim 10, further comprising deriving the measurement time base for producing the position error signals from the timing reference signal.

Claim 12 (Currently amended): The method of claim 10 in which writing the timing reference signal comprises writing an AC frequency that lies in a playback null of the time-based ~~servo~~positioning~~servo~~ positioning system.

Claim 13 (Original): The method of claim 12, in which the writing comprises writing the timing reference signal and the time-based servo signal at different azimuth angles with respect to each other.

Claim 14 (Original): The method of claim 12, in which the time-based servo signal comprises at least one sample, each sample comprising at least two pulses, the spacing between the pulses being such that the pulses fall on unique phases of the timing reference signal.

Claim 15 (Original): The method of claim 14, in which there are four pulses in each sample, each of the four pulses falling ninety degrees out of phase with each other, and a first pulse falling on a zero degree phase of the timing reference signal.

Claim 16 (Original): The method of claim 10, in which the writing further comprises writing a side band amplitude modulated component in the timing reference signal.

Claim 17 (Original): The method of claim 16, in which the writing further comprises writing a double side band amplitude modulated component in the timing reference signal.

Claim 18 (Original): The method of claim 16, in which the writing further comprises writing in the modulated component at least one of linear position data, manufacturing data, synchronization data, error detection data, error correction data, and encoded data.

Claim 19 (New): A linear data recording medium comprising:

a recorded time-based servo signal including servo samples recorded in a servo band, wherein each of the servo samples includes a set of two or more time-based servo pulses recorded at different azimuths and extending across the servo band; and

a recorded timing reference signal recorded in the servo band, wherein the time-based servo pulses are superimposed with the timing reference signal.

Claim 20 (New): The linear data recording medium of claim 19, wherein the servo samples define a servo sample rate for the medium and wherein a bandwidth of the timing reference signal is greater than the sample rate.

Claim 21 (New): The linear data recording medium of claim 19, wherein the timing reference signal is a modulated timing reference signal.

Claim 22 (New): The linear data recording medium of claim 21, wherein the timing reference signal is modulated with linear position (LPOS) information.

Claim 23 (New): The linear data recording medium of claim 19, wherein the time-based servo pulses are recorded in the servo band relative to the timing reference signal such that different pulses are recorded at different phases of the timing reference signal.

Claim 24 (New): A method comprising:

- recording a timing reference signal throughout a servo band of a linear data recording medium; and
- recording a time-based servo signal in the servo band, the time-based servo signal including a set of two or more time-based servo pulses recorded at different azimuths and extending across the servo band of the medium, wherein the time based servo pulses are superimposed with the timing reference signal.

Claim 25 (New): The method of claim 24, further comprising modulating the timing reference signal to encode linear position (LPOS) information on the medium.

Claim 26 (New): A servo positioning system comprising:

- a linear data recording medium comprising a recorded time-based servo signal including servo samples recorded in a servo band, wherein each of the servo samples includes a set of two or more time-based servo pulses recorded at different azimuths and extending across the servo band, and a recorded timing reference signal recorded in the servo band, wherein the time based servo pulses are superimposed over the timing reference signal;

- a head positioned to read the signals recorded in the servo band; and
- circuitry to separate the time-based servo signal and the timing reference signal, and demodulate the time-based servo signal using the timing reference signal.

Claim 27 (New): The servo positioning system of claim 26, wherein the circuitry generates position error signals based on the demodulated the time-based servo signal and adjusts positioning in of the head based on the position error signals.